UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,007	03/25/2004	Yu Jen Chen	24061.102 (TSMC2003.0425)	8989

42717 7590 07/28/2009

HAYNES AND BOONE, LLP
IP Section
2323 Victory Avenue
Suite 700
Dallas, TX 75219

EXAMINER	
STERRETT, JONATHAN G	

ART UNIT	PAPER NUMBER
3623	

MAIL DATE	DELIVERY MODE
07/28/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/811,007	CHEN ET AL.	
	Examiner	Art Unit	
	JONATHAN G. STERRETT	3623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4-16-09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This **Final Office Action** is responsive to 26 March 2009. Currently **Claims 1-23** are pending.

Response to Amendment

2. The 35 USC 101 rejections are withdrawn

Response to Argument

3. The applicants arguments have been fully considered but are not persuasive.

The applicant attempts to traverses the examiner's taking of official notice regarding ranking factories in a list (i.e. benchmarking) based on at least one parameter of the factories.

The examiner notes that the MPEP requires that an adequate traversal provide the requirement that "To adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art. See 37 CFR1.111(b)." The applicant has not stated why benchmarking or ranking factories according to a parameter associated with the factories is not old and well known, thus the applicant has not adequately traversed the taking of Official Notice. The taking of Official Notice is maintained and the limitation is admitted prior art. Nonetheless, the examiner points the applicant to the following reference for the limitation:

"SAP Partnership", 2001 webpage of PMGBenchmarking.com, retrieved from

http://web.archive.org/web/20010210225119/www.pmgbenchmarking.com/sap/sap_4.html

The applicant's argue that Brown fails to teach a virtual lab.

The examiner respectfully disagrees.

The applicant relies on the exemplary discussion in the specification as to what a virtual fab entails. However, the examiner notes that the applicant has not invoked lexicography in the specification to set forth a definition as to what a "virtual fab" is with the required clarity, deliberateness and precision.

Accordingly, since Brown teaches a simulation engine for simulating what happens in a factory (Brown is using the factory simulation engine to determine what happens when parameters in the factory simulation are changed before those parameters are done for real in the actual factory), Brown's factory simulation is a "virtual fab" since Brown's factory is simulated (i.e. is virtual as opposed to real) and is a fabrication facility, i.e. a factory or fab. Furthermore, since Brown shows that the Factory Models are connected to the capacity, cost and simulation engines, this meets the claimed limitations of "an inference engine" operably coupled to a virtual fab, since the engines running the simulation are connected to the Factory Models (i.e. the virtual Fab).

The applicants argue that Brown fails to teach the limitations of Claim 2 regarding various parameters used in simulating the fab.

The examiner respectfully disagrees.

Brown teaches a silicon wafter fab – this, according to a broadest reasonable interpretation of the claim language, would be a “manufacturing technology” (i.e. having to do with silicon-based solid state manufacturing) and would also be a parameter of “chip implementation”. The wording of the limitation in claim 2 is sufficiently broad “the parameter includes one of" such that only one of the items listed is required. Although the applicant refers to the specification as to for the meaning of chip implementation, the examiner notes that the applicant has not invoked lexicography in the specification to set forth a specific meaning with clarity, deliberateness and precision.

The applicant attempts to traverses the examiner’s taking of official notice regarding Claims 3 and 4 regarding manufacturing technology for silicon wafer manufacturing being the various circuit width's claimed and the various solid state product types.

The examiner notes that the MPEP requires that an adequate traversal provide the requirement that “To adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner’s action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art. See 37 CFR1.111(b).” The applicant has not stated why these aspects are not old and well known in the art, thus the subject of the Official Notice is taken to be admitted prior art.

Furthermore, these limitations are intended use with the claim limitations of simulating a wafer fab. There's nothing in the previous claims that changes regardless

of whether the product type is, for example, RF, or whether the circuit width (manufacturing technology) is a particular dimension. In fact, the limitations of claim 1 are so broad with respect to simulating a factory in operation that a reference teaching manufacture of consumer package goods (e.g. laundry detergent) in a simulation context would read on the parameter selection, client information collection and calculation steps of claim 1

The applicant argues that Brown fails to teach the limitations of claim 13 regarding the wafer fab being an entity of a "communications network".

The examiner respectively disagrees.

The applicant does not realize how broad this claim limitation is. Again, the examiner would point out to the applicant that examiners cannot (i.e. are forbidden to) reading definitions from the specification into the claims, when the applicant has not acted as their own lexicographer. The examiner notes that the claim does not say that the wafer fab communicates over a communication network, nor does the fab connect electronically to the communication network, nor does the claim say that the fab establishes communication with the network using a network protocol. The claim simply says that the fab is an entity of a communication network. A supply chain is a type of communication network where suppliers and customers communicate over the supply chain network (i.e. a supplier is one node and the customer is another node in the supply chain network). Since Brown teaches that wafer fabs are part of the supply

chain (i.e. the supply chain network), this meets the limitation that the wafer fab is an entity of the supply chain network (i.e. the communication network).

The applicant attempts to traverse the findings of the examiner regarding the Official Notice of the limitations of Claim 14.

The examiner respectfully disagrees.

The applicant has provided no evidence that on its face, shows that the subject of the Official Notice is not old and well known, thus the subject of the Official Notice maintained and taken to be admitted prior art. Support for the Official Notice can be found:

Research in object-oriented manufacturing simulations: an assessment of the state of the art-
S Narayanan, DA Bodner, T Govindaraj, LF … - IIE transactions, 1998 - Springer

The applicant argues that the cited reference of Brown fails to teach the limitations of Claims 19 and 20

The examiner respectfully disagrees.

Claim 19 recites tracking client data associated with relevant parameters. Since Brown teaches inputting factory simulation data for the purposes of running a simulation to see how various parameters affect factory performance, the data associated with these parameters is tracked (i.e. stored).

Claim 20 recites setting up parameter-base cost functions. Brown teaches setting up a parameter based cost function in showing how operator staffing affects cycle time (i.e. a kind of cost, since saving time is recognized as saving money), thus the parameter based (based on operator staffing) function is a cost function since it shows how the staffing affects cost.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 23 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 23 is rejected under 35 U.S.C. 101 based on Supreme Court precedent, and recent Federal Circuit decisions, the Office's guidance to examiners is that a § 101 process must (1) be tied to another statutory class (such as a particular apparatus) or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. In Re Bilski, Diamond v. Diehr, 450 U.S. 175, 184 (1981); Parker v. Flook, 437 U.S. 584, 588 n.9 (1978); Gottschalk v. Benson, 409 U.S. 63, 70 (1972); Cochrane v. Deener, 94 U.S. 780,787-88 (1876).

An example of a method claim that would not qualify as a statutory process would be a claim that recited purely mental steps. Thus, to qualify as a § 101 statutory process, the claim should positively recite the particular machine or apparatus to which it is tied, for example by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state.

Claim 23 is a system which is comprised of software modules (a virtual fab, an inference engine, a user interface, a knowledge collection module and a calculation module), not tangibly embodied on computer readable medium. Software not tangibly embodied as such is considered printed matter, which is not statutory under 35 USC 101.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6 **Claims 1-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown, et al; "A Centralized Approach to Factory Simulation", 1997, Future Fab International, pp.1-9, (hereinafter **Brown**).

Regarding **Claims 1, 17 and 23**, Brown teaches:

1. An inference engine communicably coupled to a virtual fab, wherein the inference engine is configured to rank a plurality of clients using at least one parameter associated with each of the plurality of clients, the inference engine comprising:

a user interface configured to enable a user to select the at least one parameter;

page 3 Figure 1, the user interface is configured to allow the user to select at least one parameter in simulation modeling of the fab.

a knowledge collection module configured to collect client information based on the at least one parameter; and

page 2 para 5, data is imported of at least one parameter to model a wafer fab

a calculation module configured to receive the collected information and calculate a client listing using a parameter-based cost function.

page 2 para 5,6; page 3 Figure 1, the semiconductor facility information is received and run through the capacity, cost and simulation engines (i.e. a calculation module).

Brown teaches calculating cost parameters and performance parameters for a wafer fab (i.e. semiconductor manufacturing). Brown further teaches that the simulation can be provided for various factories as part of a consulting effort to help individual

factories improve performance. While Brown does not explicitly teach ranking the various factories in a list (i.e. benchmarking list), Official Notice is taken that this approach is old and well known in the art, and would have been obvious to combine with Brown's teachings by one of ordinary skill in the art at the time of the invention since Brown teaches improving the performance of various factories based on that factory's individual data. This would have provided a predictable result by benchmarking the factories against each other in a list to show their relative performance.

Furthermore while Brown teaches the claimed method steps, and Brown suggests using a PC because of the use of Microsoft Excel™ to input data, Brown does not explicitly teach the use of software or a computer system to perform the method steps per se. However using software and a computer system (i.e. including using software modules running in the system) to automate method steps is known in the art and is known to improve the method steps because the automation is known to make the method steps faster and more efficient since they are being performed on a computer. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to automate the teachings of Brown using software because of the recognized advantages of using software to improve the operation of method steps.

Regarding **Claim 2**, Brown teaches:

2.The inference engine of claim 1 wherein the at least one parameter includes one of manufacturing technology, product type, volume of purchase order, client physical region, design library, tapeout instance, technology file, and chip implementation.

Page 4 #2; since Brown's factory is a wafer fab (i.e. silicon wafer), the parameter is chip implementation.

Regarding **Claims 3 and 4**, Brown teaches the simulation of a wafer wab using a computer based modeling approach. While Brown does not explicitly teach various circuit widths in silicon (as per Claim 3 or different types of solid state devices, as per Claim 4), these aspects of semiconductor manufacturing are old and well known in the art (Official Notice) and would have provided a predictable result in combination with the teachings of Brown because Brown teachings various simulation and modeling techniques for a semiconductor manufacturing facility (i.e. a wafer fab). Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the circuit width aspects of Claim 3 and the solid state device types of Claim 4 into the teachings of Brown because these elements are known in the art and would have provided a predictable result in combination with Brown's teachings.

Regarding **Claim 5**, Brown teaches:

5. The inference engine of claim 1 wherein the parameter-based cost function comprises the at least one parameter.

Page 4 Figure 2, cycle time is a cost parameter – other parameters are used in modeling cycle time, which impacts the cost function.

Regarding **Claim 6**, Brown teaches:

6. The inference engine of claim 5 wherein the parameter-based cost function further comprises at least one weighting factor corresponding to the at least one parameter.

Page 4 #2, since the factory cost curve that models the various parameters is based on the relationship between the various parameters, then these parameters are combined (i.e. weighted, since they are combined together).

Regarding **Claim 7**, Brown teaches:

7. The inference engine of claim 6 wherein the parameter-based cost function is a linear function including at least one term wherein each term is a product of one of the at least one parameter and one of the at least one weighting factor correspondingly.

As per claim 6, Brown teaches a cost curve that is a function of various parameters. Since these parameters are combined, this implies that there is a weighting factor used in combining the various factors (i.e. even in a simple additive combination, the factors would have weights of 1, e.g. x = y + z).

Regarding **Claim 8**, Brown teaches:

8. The inference engine of claim 6 wherein the parameter-based cost function is a non-linear function.

Page 4 Figure 2, cycle time is a non-linear cost function per cost per good unit out.

Regarding **Claim 9**, Brown teaches:

9. The inference engine of claim 1 wherein the parameter-based cost function is built in the calculation module.

Page 3 Figure 1 – the cost engines are built into the Factory Explorer™ software.

Regarding **Claim 10**, Brown teaches:

10. The inference engine of claim 1 wherein the parameter-based cost function is set up by a user.

Page 5 bottom para, the parameter based cost function (i.e. operator constraints) is set up by the user.

Regarding **Claim 11**, Brown teaches:

11. The inference engine of claim 1 wherein the inference engine is further connected to a virtual fab.

Page 3 Figure 1 and Page 4 top paragraph, the Factory Models are connected to the Capacity, Cost and Simulation engines, i..e. a virtual fab.

Regarding **Claim 12**, Brown teaches:

12. The inference engine of claim 11 wherein the knowledge collection module collects the client information from a plurality of client databases in the virtual fab.

Page 3 Figure 1, the collection of information comes from a combination of models – see also page 3 bottom para – input data for models. While Brown does not teach a plurality of client databases for data input, Brown does teach the input of various data from different client database (since Brown is teaching the modeling of more than one factory). Official Notice is taken that inputting data from a database, where the data is stored in the database, is old and well known and would have provided a predictable result in combination with the teachings of Brown regarding the modeling of various factories. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Brown regarding modeling various client factories to include where the data comes from a client database because it would have provided a predictable result in the modeling of various factories by using data stored in a database for each factory.

Regarding **Claim 13**, Brown teaches

13. The inference engine of claim 11 wherein the virtual fab is an entity of network.

Page 7, "concluding remarks", Brown teaches that managing an individual factory is and important element in supply chain management (i.e. the supply chain is a type of network)

Regarding **Claim 14**, Brown teaches a supply chain network as per Claim 13 above, and teaches a plurality of nodes in processing in a manufacturing setting (see page 5 Figure 3 and the Operator constraints on cycle time - i.e. implying worker nodes for processing wafers) While Brown's teachings do not include the various nodes as listed, Official Notice is taken that it is old and well known in the art to simulate based on a plurality of nodes (ie.. as in a supply chain management context). The types of nodes further claimed are taken under Official Notice to be old and well known in the art in semiconductor manufacturing. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Brown's virtual fab teachings of semiconductor manufacturing, to include the additional nodes of a an engineer entity; a foundry entity; a design library entity, because it would have provided a predictable result in simulation of a wafer fab. Further, Brown notes a variety of data inputs, but not a database for managing those data inputs, however, the use of databases is old and well known in the art and would have provided a predictable result in providing a data repository for input in to the simulation teachings of Brown and thus it would have been obvious to one of ordinary skill in the art at the time of the invention to include a plurality of databases to function as input data repositories into the simulation teachings of

Brown, because it would have provided a predictable result in providing a repository for data to be retrieved from in modeling the various wafer fabs as taught by Brown.

Regarding **Claim 15**, Brown teaches:

15. The inference engine of claim 1 wherein the user interface provides an interface of communication between a user and the inference engine.

Page 3 Figure 1, the user interface provides and interface of communication between the various engines and the output reports and charts that communicate the status of the wafer fab simulations.

Regarding **Claim 16**, Brown teaches:

16. The inference engine of claim 15 wherein the communication comprises:

selecting parameters for the cost function;

page 4 #1, a factory simulation of a line selects parameters for the cost function describing the output of the line

selecting the cost function;

page 4 Figure 2, cost per good unit output is the cost function selected

selecting a weighting factor for each of the parameters;

page 4#2, since the analyst creates a curve that shows the relationship between the factors, this is selection of a weighting factor for the various parameters.

choosing time scope and region scope; and

Page 4 Figure 2, days is the time scope – the region scope is the particular factory.

displaying a result.

Page 4 Figure 2, the result of the simulation for a particular wafer fab line is displayed.

Claims 17-23 recite similar limitations to those addressed by the rejection of **Claims 1-16** above, and are therefore rejected under the same rationale.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

PANEL SESSION: THE FUTURE OF SIMULATION

BA Peters, JS Smith, DJ Medeiros, MW ... - Proceedings of the 2001 Winter Simulation Conference, 2001 - informs-sim.org

Optimization of cycle time and utilization in semiconductor test manufacturing using simulation based, on-line, near-real-time scheduling system.

AI Sivakumar - Simulation Conference Proceedings, 1999 Winter, 1999 - ieeexplore.ieee.org

Simulating test program methods in semiconductor assembly test factories

BA Peters, JS Smith, DJ Medeiros, MW ... - Proceedings of the 2001 Winter Simulation Conference, 2001 - simulation.section.informs.org

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan G. Sterrett whose telephone number is 571-272-6881. The examiner can normally be reached on 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Beth Boswell can be reached on 571-272-6737. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JGS 7-23-09

/Jonathan G. Sterrett/

Primary Examiner, Art Unit 3623